

TRW

PTO/SB/21 (02-04)

Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

TRANSMITTAL FORM <i>(to be used for all correspondence after initial filing)</i>	Application Number	10/711,180	
	Filing Date	2004/8/31	
	First Named Inventor	Pei-Ching Kuo	
	Art Unit		
	Examiner Name		
Total Number of Pages in This Submission	3	Attorney Docket Number	LITP0047USA

ENCLOSURES (Check all that apply)

<input checked="" type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input checked="" type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s)	<input type="checkbox"/> After Allowance communication to Technology Center (TC) <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Other Enclosure(s) (please identify below):
Remarks		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Winston Hsu, Reg. No.: 41,526		
Signature			
Date	9/16/2004		

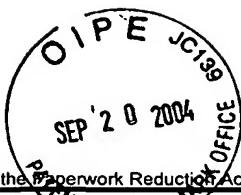
CERTIFICATE OF TRANSMISSION/MAILING

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Typed or printed name			
Signature		Date	

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PTO/SB/17 (10-03)

Approved for use through 07/31/2006. OMB 0651-0032
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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

 Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$ 0.00)

Complete if Known

Application Number	10/711,180
Filing Date	2004/8/31
First Named Inventor	Pei-Ching Kuo
Examiner Name	
Art Unit	
Attorney Docket No.	LITP0047USA

METHOD OF PAYMENT (check all that apply)

 Check Credit card Money Order Other None Deposit Account:

Deposit Account Number	50-3105
Deposit Account Name	North America Intellectual Property Corp.

The Director is authorized to: (check all that apply)

- Charge fee(s) indicated below Credit any overpayments
 Charge any additional fee(s) or any underpayment of fee(s)
 Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity	Fee Code (\$)	Small Entity	Fee Code (\$)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	
SUBTOTAL (1)		(\$ 0.00)			

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	-20** =	Extra Claims	Fee from below	Fee Paid
Independent Claims	- 3** =			
Multiple Dependent				

Large Entity	Small Entity	Fee Description
1202	18	2202 9 Claims in excess of 20
1201	86	2201 43 Independent claims in excess of 3
1203	290	2203 145 Multiple dependent claim, if not paid
1204	86	2204 43 ** Reissue independent claims over original patent
1205	18	2205 9 ** Reissue claims in excess of 20 and over original patent
SUBTOTAL (2)		(\$ 0.00)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Small Entity

Fee Code (\$)	Fee (\$)	Fee Code (\$)	Fee (\$)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for ex parte reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$ 0.00)

(Complete if applicable)

Name (Print/Type)	Winston Hsu	Registration No. (Attorney/Agent)	41,526	Telephone 886289237350
Signature				
Date	9/16/2004			

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

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PTO/SB/02B (08-03)

Approved for use through 08/31/2003. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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DECLARATION – Supplemental Priority Data Sheet

Foreign applications:

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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中華民國經濟部智慧財產局

INTELLECTUAL PROPERTY OFFICE
MINISTRY OF ECONOMIC AFFAIRS
REPUBLIC OF CHINA

茲證明所附文件，係本局存檔中原申請案的副本，正確無訛，
其申請資料如下：

This is to certify that annexed is a true copy from the records of this office of the application as originally filed which is identified hereunder.

申請日：西元 2003 年 09 月 04 日
Application Date

申請案號：092124522
Application No.

申請人：建興電子科技股份有限公司
Applicant(s)

局長
Director General

蔡練生

CERTIFIED COPY OF
PRIORITY DOCUMENT

發文日期：西元 2004 年 5 月
Issue Date

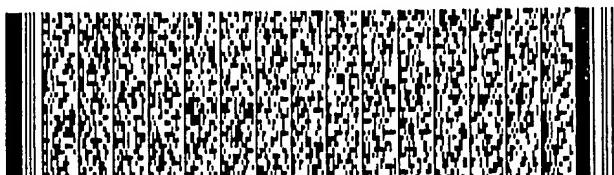
發文字號：09320411440
Serial No.

申請日期：	IPC分類
申請案號：	

(以上各欄由本局填註)

發明專利說明書

一、 發明名稱	中 文	可偵測振動/衝擊之元件
	英 文	Device Capable of Detecting Vibration/Shock
二、 發明人 (共2人)	姓 名 (中文)	1. 郭佩菁
	姓 名 (英文)	1. Kuo Pei-Ching
	國 籍 (中英文)	1. 中華民國 TW
	住居所 (中 文)	1. 新竹市科學園區力行路12號5樓
	住居所 (英 文)	1. 5F, No. 12, Li-Hsin Road, Science-Based Industrial Park, Hsinchu 300, Taiwan R.O.C.
三、 申請人 (共1人)	名稱或 姓 名 (中文)	1. 建興電子科技股份有限公司
	名稱或 姓 名 (英文)	1. LiteON IT Corporation
	國 籍 (中英文)	1. 中華民國 TW
	住居所 (營業所) (中 文)	1. 新竹市科學園區力行路12號5樓 (本地址與前向貴局申請者不同)
	住居所 (營業所) (英 文)	1. 5F, No. 12, Li-Hsin Road, Science-Based Industrial Park, Hsinchu 300, Taiwan R.O.C.
代表人 (中文)	1. 宋恭源	
代表人 (英文)	1. Raymond Soong	



IPC分類

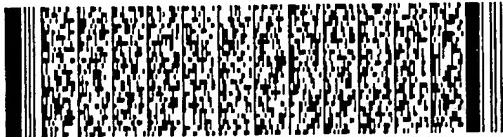
申請日期：

申請案號：

(以上各欄由本局填註)

發明專利說明書

一 發明名稱	中 文	
	英 文	
二 發明人 (共2人)	姓 名 (中文)	2. 廖正堯
	姓 名 (英文)	2. Liao Cheng-Yao
	國 籍 (中英文)	2. 中華民國 TW
	住居所 (中 文)	2. 新竹市科學園區力行路12號5樓
	住居所 (英 文)	2. 5F, No. 12, Li-Hsin Road, Science-Based Industrial Park, Hsinchu 300, Taiwan R.O.C.
三 申請人 (共1人)	名稱或 姓 名 (中文)	
	名稱或 姓 名 (英文)	
	國 籍 (中英文)	
	住居所 (營業所) (中 文)	
	住居所 (營業所) (英 文)	
	代表人 (中文)	
代表人 (英文)		

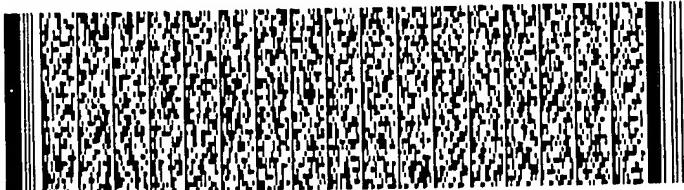


四、中文發明摘要 (發明名稱：)

本發明為一種可偵測振動/衝擊之元件。將整合於一晶片的雷射二極體與振動/衝擊感測器或者整合於一晶片的光偵測器與振動/衝擊感測器置於光碟機讀寫頭，使得光碟機讀寫頭之中具有偵測振動/衝擊的元件。因此，光碟機可獲得即時的振動/衝擊偵測，改善以循軌誤差訊號來判斷振動/衝擊時反應過慢或誤判的情形發生。

五、英文發明摘要 (發明名稱：Device Capable of Detecting Vibration/Shock)

The present invention discloses a device capable of detecting vibration/shock. A pick-up head of an optical drive has a laser chip integrated with a vibration/shock sensor or a photo detector chip integrated with a vibration/shock sensor. The pick-up head can immediately detect vibration or shock by the sensor. In this way, the drawbacks of sensing delay or error detection by using



四、中文發明摘要 (發明名稱：)

五、英文發明摘要 (發明名稱：Device Capable of Detecting Vibration/Shock)

tracking error signal can be salved.



六、指定代表圖

(一)、本案代表圖為第2(a)、2(b)圖

(二)、本案代表圖之元件代表符號簡單說明：

60 晶片

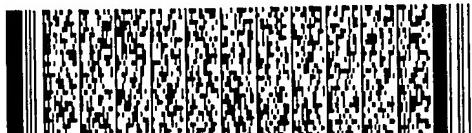
62 光偵測器

64 振動/衝擊感測器

70 晶片

72 雷射二極體

74 振動/衝擊感測器



一、本案已向

國家(地區)申請專利

申請日期

案號

主張專利法第二十四條第一項優先權

無

二、主張專利法第二十五條之一第一項優先權：

申請案號：

無

日期：

三、主張本案係符合專利法第二十條第一項第一款但書或第二款但書規定之期間

日期：

四、有關微生物已寄存於國外：

寄存國家：

無

寄存機構：

寄存日期：

寄存號碼：

有關微生物已寄存於國內(本局所指定之寄存機構)：

寄存機構：

無

寄存日期：

寄存號碼：

熟習該項技術者易於獲得，不須寄存。



五、發明說明 (1)

【發明所屬之技術領域】

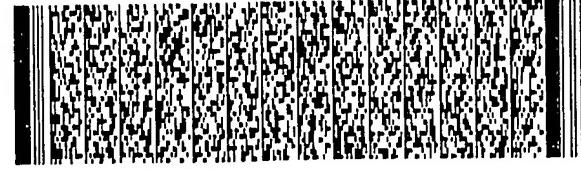
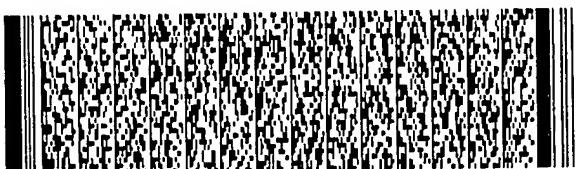
本發明是有關於一種可偵測振動/衝擊之元件，且特別是有關於一種整合振動/衝擊感測器於雷射二極體或者光感測器晶片中之光碟機讀寫頭。

【先前技術】

一般來說，光碟機受到振動/衝擊時會造成光碟機讀取光碟片資料或者寫入光碟片資料發生錯誤，或者由於振動過於激烈而導致光碟機讀寫頭或者光碟片損傷。

為了防止光碟機或者光碟片損傷，光碟機必須要有偵測振動/衝擊之機制。一般來說，在光碟機中，循軌誤差(Tracking Error)訊號可用來作為判斷光碟機振動/衝擊的判斷訊號。當光碟機受到振動/衝擊時，循軌誤差訊號的穩態誤差(Steady State Error)會變大，甚至變成不穩定的震盪。因此，利用偵測循軌誤差訊號的狀況可以決定光碟機受到的震動/衝擊的大小，而相對於此振動/衝擊光碟機所必須採取的動作，例如，降低光碟機轉速，或者關機(Shut Down)。

然而，習知利用循軌誤差訊號來作為判斷光碟機所受之振動/衝擊的方法可能不夠即時，亦即，當光碟機利用循軌誤差訊號來偵測光碟機受到的振動/衝擊時，通常傷害已經造成，也就是說，讀取光碟片資料或者寫入光碟片



五、發明說明 (2)

資料已經發生錯誤。

再者，有時振動/衝擊並不會伴隨循軌誤差訊號產生，或者循軌誤差訊號的穩態誤差的變化並不是由光碟機受到振動/衝擊所造成。因此，習知利用循軌誤差訊號來作為判斷光碟機受到振動/衝擊的方法會產稱誤判，造成光碟機讀寫時的效率降低。

【發明內容】

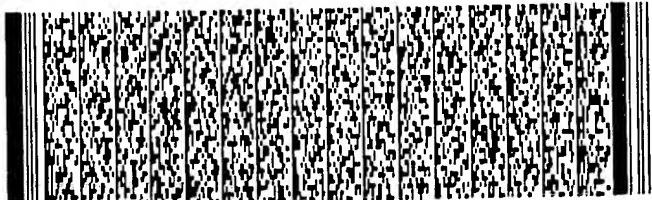
發明目的

本發明的目的係提供一種可偵測振動/衝擊之元件。其可獲得即時的振動/衝擊偵測，改善以循軌誤差訊號來判斷振動/衝擊時反應過慢或誤判的情形發生。

【發明特徵】

本發明提出一種可偵測振動/衝擊之元件，其簡述如下：雷射二極體可發出一雷射光束；以及，振動/衝擊感測器係用以偵測光碟機之振動力或者衝擊力；其中，雷射二極體與振動/衝擊感測器係形成於單一晶片上。

本發明更提出一種可偵測振動/衝擊之元件，其簡述如下：光偵測器接收反射的雷射光束；以及，振動/衝擊感測器係用以偵測光碟機之振動力或者衝擊力；其中，光偵測器與振動/衝擊感測器係形成於單一晶片上。



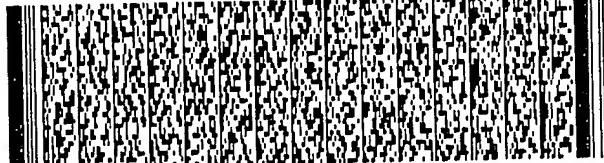
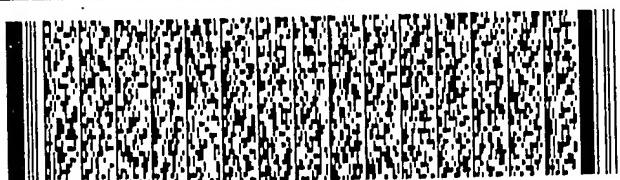
五、發明說明 (3)

為了使 貴審查委員能更進一步瞭解本發明特徵及技術內容，請參閱以下有關本發明之詳細說明與附圖，然而所附圖式僅提供參考與說明用，並非用來對本發明加以限制。

【發明實施方式】

請參照第1圖，其所繪示為光碟機讀寫頭與光碟片相對位置示意圖。一般來說，光碟機讀寫頭40中至少有雷射二極體(Laser Diode)20，分光器(Beam Splitter)50，光偵測器(Photo Detector)30。其中，雷射二極體20發出雷射光束12，經過分光器50聚焦於光碟片10上，而光碟片10上的反射雷射光束14會經過分光器50，改變方向並由光偵測器30接收反射雷射光束。

請參照第2(a)、與2(b)圖，其所繪示為本發明可偵測振動/衝擊之光碟機讀寫頭之示意圖。如第2(a)圖之繪示，振動/衝擊感測器64係整合於光偵測器62的晶片上。一般來說，振動/衝擊感測器64可為壓電式、壓阻式、電容式等等的形式。而這些振動/衝擊感測器可根據結構的改變，例如，應變、位移、或者加速度，來決定本身所接受的震動/衝擊的大小。而這些振動/衝擊感測器之製作皆可相容於一般的積體電路製程。也就是說，利用一般積體電路的設備即可完成振動/衝擊感測器的製作。因此，利



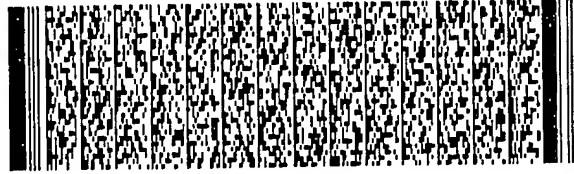
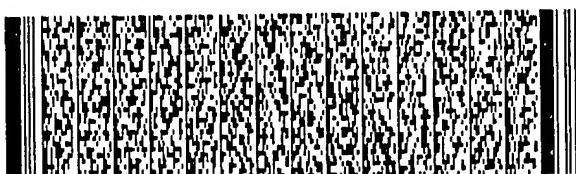
五、發明說明 (4)

用製作光偵測器62的製程，即可在相同的晶片60上形成一振動/衝擊感測器64。

同理，第2(b)圖係為振動/衝擊感測器整合於雷射二極體之示意圖。由於振動/衝擊感測器74亦可整合於者雷射二極體72製程。因此，將振動/衝擊感測器74整合於雷射二極體72的製程即可完成如第2(a)圖之整合元件(整合振動/衝擊感測器74與雷射二極體72)。如此，可降低晶片的製作成本，並更可以將二元件的控制電路直接製作於單一晶片70上。

再者，由於本發明的光碟機讀寫頭中具有一振動/衝擊感測器，因此，習知以循軌誤差訊號來判斷光碟機受到振動/衝擊的機制即可以本發明來取代。再者，習知光碟機振動/衝擊的誤判機率也可大幅降低。

舉例來說，請參照第3(a)、3(b)、3(c)圖，其所繪示為整合光偵測器與振動衝擊感測器於單一晶片之結構示意圖。如第3(a)圖之繪示，在P型基板(P substrate)上以離子佈植法形成一高摻雜N型區域，並以金屬材料82接觸P型基板以及高摻雜N型區域即可形成一PN型光偵測器80。再者，在形成光偵測器80的製程中，形成介電層(Dielectric Layer)84時，可在介電層84中形成堆疊的金屬材料92。



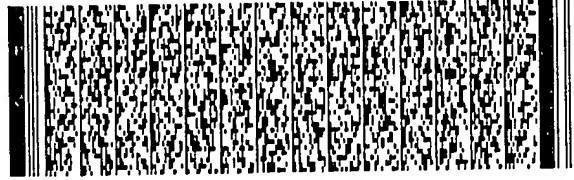
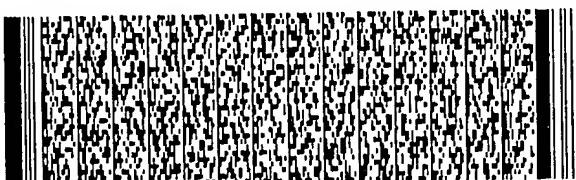
五、發明說明 (5)

如第3(b)圖之繪示，在介電層中指狀電極之區域上利用介電層之深反應離子性蝕刻(Deep Reactive Ion Etch，DRIE)步驟，以形成指狀電極(Comb Fingers)94。

接著，如第3(c)圖之繪示，最後再將此晶片作基板的等向性蝕刻(Isotropic Etch)，之後，即形成指狀電極的懸浮結構96，並且完成振動/衝擊感測器。因此，第3(c)圖即為整合於單一晶片之光偵測器80與振動/衝擊感測器90。

因此，本發明的優點係提出一種可偵測振動/衝擊之元件。本發明將整合於一晶片的雷射二極體與振動/衝擊感測器或者整合於一晶片的光偵測器與振動/衝擊感測器置於光碟機讀寫頭，使得光碟機讀寫頭之中具有偵測振動/衝擊的元件。因此，光碟機可獲得即時的振動/衝擊偵測，改善以循軌誤差訊號來判斷振動/衝擊時反應過慢或誤判的情形發生。

綜上所述，雖然本發明已以較佳實施例揭露如上，然其並非用以限定本發明，任何熟習此技藝者，在不脫離本發明之精神和範圍內，當可作各種之更動與潤飾，因此本發明之保護範圍當視後附之申請專利範圍所界定者為準。



圖式簡單說明

第1圖所繪示為光碟機讀寫頭與光碟片相對位置示意圖；

第2(a)圖所繪示為本發明振動/衝擊感測器整合於光偵測器的晶片上；

第2(b)圖所繪示為本發明振動/衝擊感測器整合於雷射二極體的晶片上；以及

第3(a)、3(b)、3(c)圖所繪示為整合光偵測器與振動衝擊感測器於單一晶片之結構示意圖。

【圖號說明】

10 光碟片

12 雷射光束

14 反射雷射光束

20 雷射二極體

30 光偵測器

40 光碟機讀寫頭

50 分光器

60 晶片

62 光偵測器

64 振動/衝擊感測器

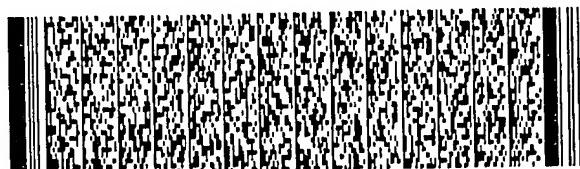
70 晶片

72 雷射二極體

74 振動/衝擊感測器

80 PN型光偵測器

82 二金屬材料



圖式簡單說明

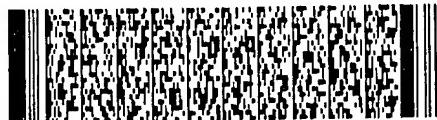
84 介電層

90 振動 / 衝擊感測器

92 堆疊的金屬材料

94 指狀電極

96 指狀電極的懸浮結構



六、申請專利範圍

1. 一種可偵測振動/衝擊之元件，至少包括：

一雷射二極體，該雷射二極體可發出一雷射光束；以及

一振動/衝擊感測器，該振動/衝擊感測器係用以偵測一振動力或者一衝擊力；

其中，該雷射二極體與該振動/衝擊感測器係形成於一晶片上。

2. 如申請專利範圍第1項所述之可偵測振動/衝擊之元件，其中該振動/衝擊感測器具有一指狀電極的懸浮結構。

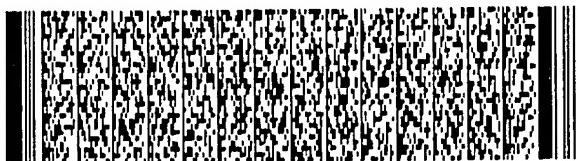
3. 一種可偵測振動/衝擊之元件，至少包括：

一光偵測器，該光偵測器接收一反射的雷射光束；以及

一振動/衝擊感測器，該振動/衝擊感測器係用以偵測一振動力或者一衝擊力；

其中，該光偵測器與該振動/衝擊感測器係形成於一晶片上。

4. 如申請專利範圍第3項所述之可偵測振動/衝擊之元件，其中該振動/衝擊感測器具有一指狀電極的懸浮結構。



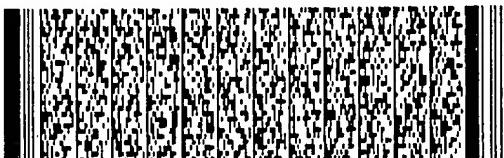
六、申請專利範圍

5. 一種可偵測振動/衝擊之光碟機讀寫頭，至少包括：

一晶片；以及

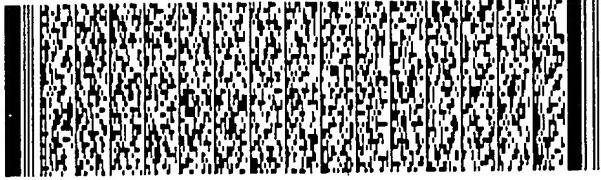
一振動/衝擊感測器，形成於該晶片上，該振動/衝擊感測器係用以偵測一光碟機之一振動力或者一衝擊力。

6. 如申請專利範圍第5項所述之可偵測振動/衝擊之光碟機讀寫頭，其中該振動/衝擊感測器具有一指狀電極的懸浮結構。

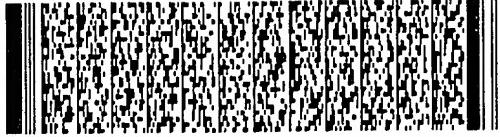


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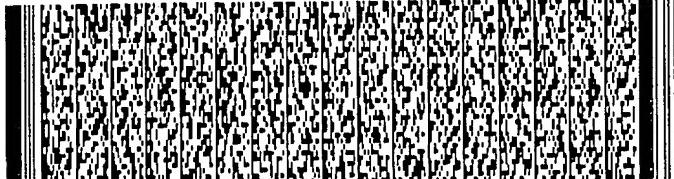
第 1/15 頁



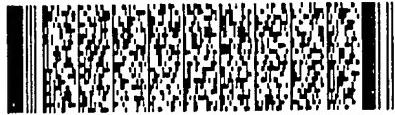
第 2/15 頁



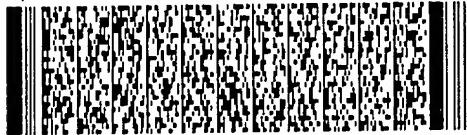
第 3/15 頁



第 4/15 頁



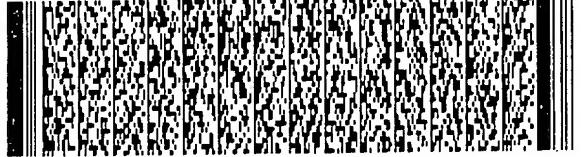
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第 6/15 頁



第 7/15 頁



第 8/15 頁



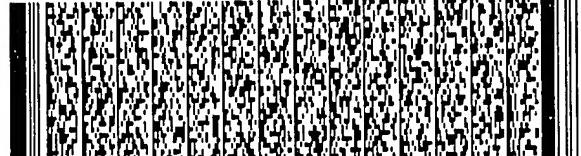
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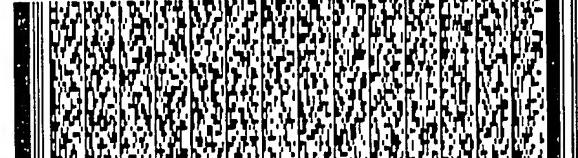
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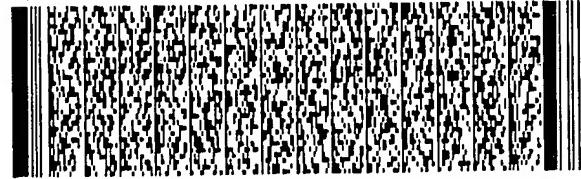
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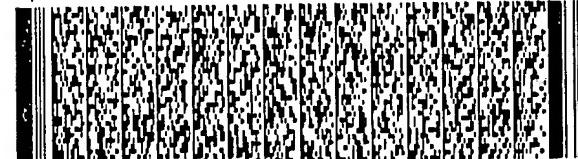
第 11/15 頁



第 11/15 頁

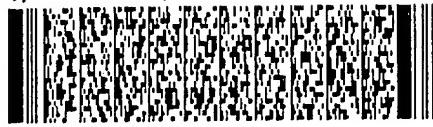


第 12/15 頁

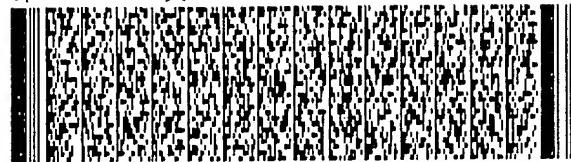


(4.6版)申請案件名稱:

第 13/15 頁



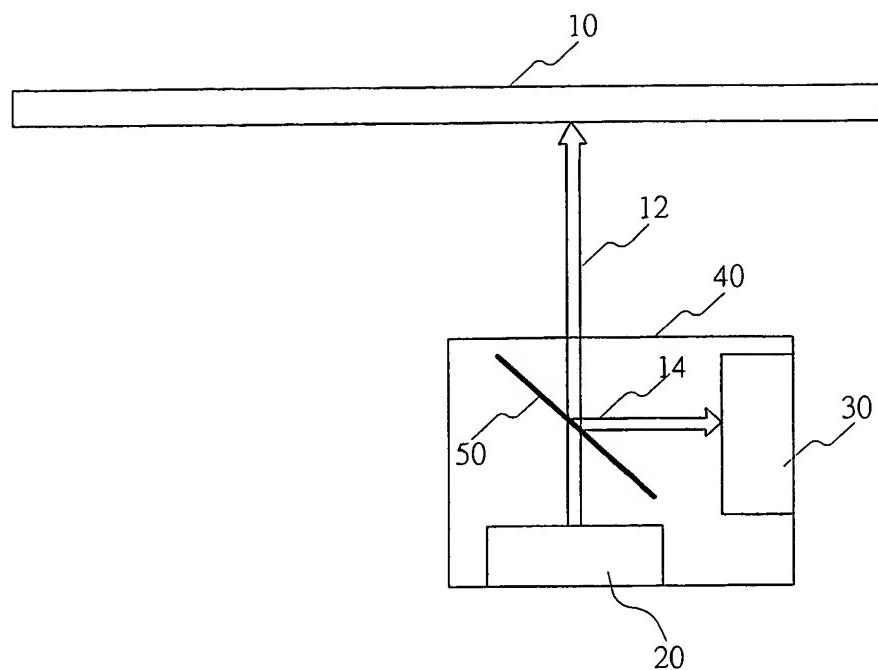
第 14/15 頁



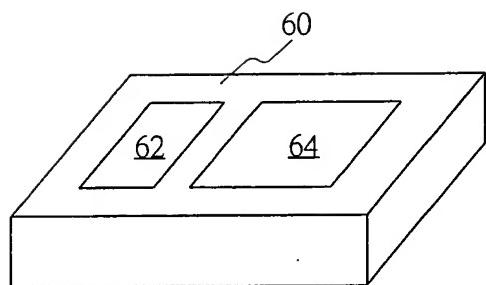
第 15/15 頁



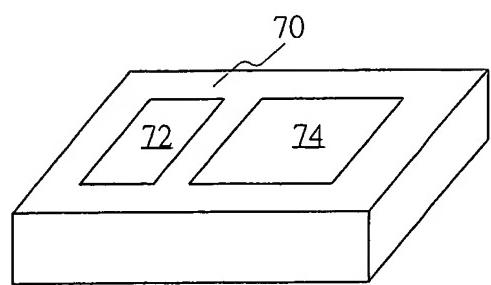
圖式



第 1 圖

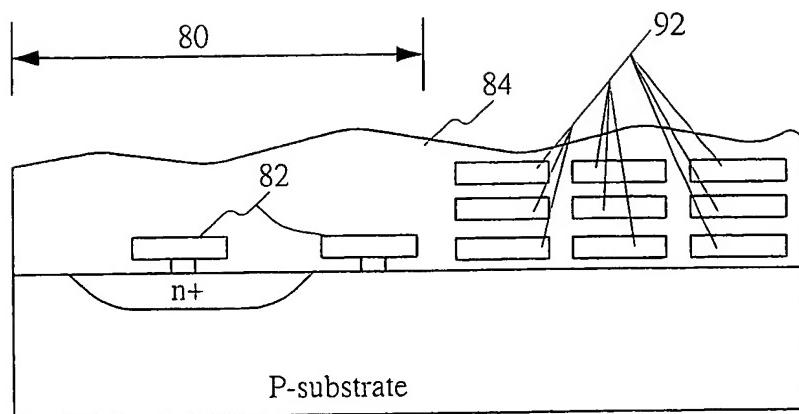


第 2(a) 圖

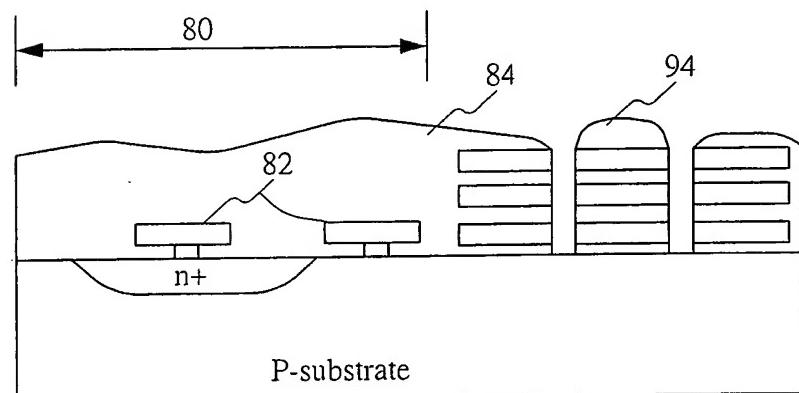


第 2(b) 圖

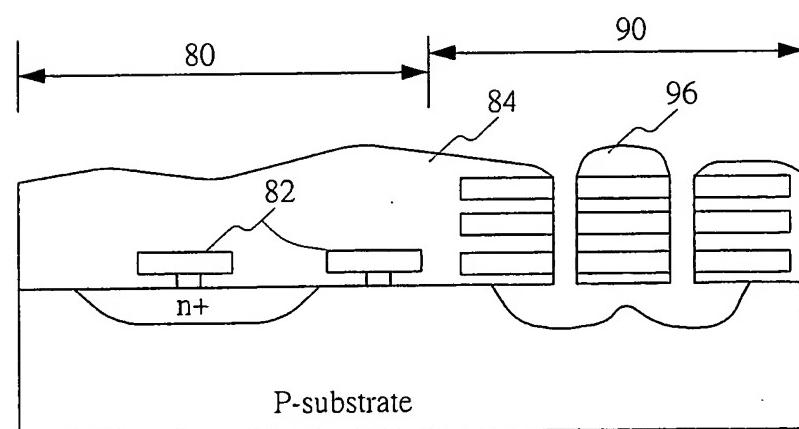
圖式



第 3(a) 圖



第 3(b) 圖



第 3(c) 圖